CGS NPDES
Comment
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APR 18 2014
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April 18, 2014

Energy Facility Site Evaluation Council
Attention: Jim La Spina
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RE: Columbia Generating Station NPDES Permit Reissuance

Thank you for the opportunity to review and comment on the draft National Pollutant Discharge Elimination System (NPDES) permit and Fact Sheet (fact sheet) for NPDES Permit WA002515-1 Columbia Generating Station. WDFW wishes to acknowledge our Washington State partner agencies, the Energy Facility Site Evaluation Council (EFSEC) and the Department of Ecology, and appreciate their effort in developing this permit and Fact Sheet.

The Washington Department of Fish and Wildlife (WDFW) mission, as supported by *RCW 77.04.012 Mandate of department and commission*, is to preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities. Wildlife, fish, and shellfish are the property of the state; subsequently WDFW has an obligation to conserve Washington's fish and wildlife resources and ecosystems for the citizens of Washington. As such, WDFW reviewed the draft permit and fact sheet with conservation of fish, wildlife and ecosystems in mind. Specifically, WDFW concentrated on cooling water intake structure and water diversion screen protection for fish.

WDFW is cognizant of the regulations and side boards set in place which defines the scope of evaluation for the NPDES. We also recognize our limited regulatory authority to influence screening improvements within the NPDES process. This is reflected in our comments.

Background Information

WDFW considered applicable Washington State codes and WDFW policies and guidelines for screening and fish protection as well as standards EFSEC used to evaluate environmental impacts for the NPDES. A summary of the relevant information is provided below to supplement and facilitate understanding of WDFW comments.

WDFW Statutes and Guidelines to Evaluate Fish Protect Screens

Applicable Washington Administrative Codes (WAC) and Revised Codes of Washington (RCW)

Several Washington Administrative Codes (WAC) and Revised Codes of Washington (RCW) relate to requiring screens on water diversions for protection of fish life and approval of fish

screen designs. These codes support WDFW's mandate to ensure fish screens on water diversions meet WDFW fish screen criteria for the proper protection of fish life.

WAC 220-110-190 Water diversions and *RCW 77.57.070 Diversion of water — Screen, bypass required*, require respectively, that any device used for diverting water from a fish bearing watercourse be equipped with a fish guard to prevent passage of fish into the diversion device, and that water not be diverted until a water diversion device is equipped with a fish guard or screen to prevent the passage of fish into the device. *RCW 77.57.010 Fish guards required on diversion devices — Penalties, remedies for failure* directs that a diversion device be equipped with a fish guard approved by the director to prevent the passage of fish into the diversion device.

The Columbia Generating Station (CGS) intake is currently fitted with standard screens to prevent entrainment of debris and gravel. However, the screening does not provide for the protection of fish life. We are concerned with the ability of the screen to prevent salmonid fry injury and mortality.

Fish Protection Screen Guidelines for Washington State

WDFW, in consultation with Northwest Region of National Marine Fisheries Service (NMFS), prepared the draft *Fish Protection Screen Guidelines for Washington State* (April 25, 2000, http://wdfw.wa.gov/publications/00050/). These guidelines are utilized by WDFW, with the support of the Director, to provide safe downstream passage for migrating juvenile salmonids and emergent fry. This document is a guideline only but is intended to describe how to comply with relevant statute, specific design criteria, and other fish protection requirements established in Hydraulic Project Approval permits and other venues.

The fish protection screen guidelines were developed based on a set of guiding principles and the following are applicable to evaluating adverse environmental conditions for the CGS intake.

- Assume worst conditions for size of fish present (steelhead swim-up fry) and water temperature;
- Use positive exclusion screening to approach 100% effectiveness.

As a result of the guiding principles, the criteria are conservative and are based on providing protection for the weakest swimming species present, in their most vulnerable life stage, under adverse environmental conditions. If protection can be provided at that level, it is expected that nearly all fish that encounter a fish screen will survive and the screen will approach 100% effectiveness.

A summary of WDFW guideline screen criteria for systems like the CGS cooling water intake structure follow. Consult the *draft Fish Protection Screen Guidelines for Washington State* for complete design criteria guidelines. The screen should provide:

- a uniform maximum approach velocity of 0.4 feet per second (fps) to allow for sustained swimming speed of the weakest swimming species present;
- an effective screen area sized for a minimum of 2.5 square feet for every cubic feet per second (cfs) of flow diverted through the screen;

- an effective screen cleaning system and/or design for debris accumulation for long-term safe passage of fish - debris accumulation on the face of a screen results in the loss of the screen's effective area and therefore an increase in approach velocity; and
- perforated plate maximum opening diameter or maximum slot width of 3/32 inch (2.38mm) to prevent entrainment of emergent salmonid fry (fork length less than 60 millimeters (mm)).

As defined in WDFW screening guidelines, entrainment is the voluntary or involuntary movement of fish through, under or around the intake screen resulting in loss of fish from the population. Entrainment is a function of screen mesh opening size, gaps between the screen frame, and the size of fish life present. Impingement is defined as entrapment, both temporary and permanent, of fish onto the face of an intake screen due to intake water velocity.

EFSEC Standards Used to Evaluate Environmental Impacts for the NPDES *(Fact Sheet page 21)*

It is essential for WDFW to understand the rules, regulations, and process that guide EFSEC's evaluation of the existence of adverse environment impacts in NPDES permit issuance and to reconcile WDFW obligations and guidelines with that process.

The Federal Clean Water Act (CWA) establishes water quality goals, and page 5 of the fact sheet notes:

"One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to the Department of Ecology (Ecology) and the Energy Facility Site Evaluation Council (EFSEC). The Legislature defined EFSEC's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington)."

As noted in the fact sheet, "*EFSEC must ensure the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact, per CWA § 316(b), 33 U.S.C. §1326(b), and 40 CFR 401.14.*" Since BTA standards applicable to CGS are not available, the level of adverse environmental impact for the intake was evaluated using the following:

- 40 CFR 125.90(b) requiring a case-by-case, best professional judgment (BPJ) determination of requirements;
- Ecology's Permit Writer's Manual for general factors to be considered for BPJ determinations;
- CWA § 316(b) for consideration of specific factors such as location, design, construction, capacity, and identification of BTA standards for minimizing adverse environmental impact; and
- 40 CFR Subpart I BTA standards for new facilities and 40 CFR Subpart J proposed rules for existing facilities.

Also noted in the fact sheet, 40 CFR Subpart I for new facilities is the only source of BTA standards available and even though these are not applicable to the existing CGS intake, they were considered. EFSEC also took into account correspondence from EPA, NMFS, U.S. Nuclear Regulatory Commission (NRC), and Energy Northwest in evaluating factors unique to the facility. Since applicable BTA standards are not available for CGS, BPJ was utilized for the majority of the evaluation to define the level of adverse environmental impact.

CGS Cooling Water Intake Structures Existing Conditions *(Fact Sheet page 21)*

CGS intake structures consist of two 42-inch diameter inlets perforated with 3/8 inch diameter holes, each approximately 20 feet long and placed parallel to river flow approximately 350 feet offshore at low water. Water flows by gravity to the River Pumphouse.

The intake structures for CGS were designed and constructed in the late 1970s and final intake design was selected to minimize adverse environmental impact (fact sheet, early correspondence provided by Energy Northwest to EFSEC). Emphasis was placed on minimizing salmonid fry entrainment by locating the intake offshore where the numbers of downstream salmonid fry are expected to be smaller; and by providing low intake approach velocities near the perforated pipe on the order of 0.2 – 0.4 fps.

Comments

WDFW compared existing CGS cooling water intake structure conditions to draft *Fish Protection Screen Guidelines for Washington State*. In addition WDFW considered the age and quality of intake data provided by Energy Northwest during the comparison.

Approach Velocity – Impingement Standards *(Fact Sheet page 22)*

40 CFR Subpart I identified maximum design intake velocity allowed as 0.5 fps, whereas the draft *Fish Protection Screen Guidelines for Washington State* has a recommendation of a uniform maximum approach velocity of 0.4 fps. An approach velocity of 0.4 fps will allow for sustained swimming speed of the weakest swimming life stage present. WDFW encourages utilizing the threshold value that will provide the best protection for the weakest swimming fish present (0.4 fps approach velocity) for evaluation of adverse environmental impacts. WDFW's obligation is to protect Washington's natural resources and it is our BPJ that an approach velocity of 0.4 fps provides that protection.

The early design documents describe intake velocities at 0.2 to 0.4 fps. It is unclear if the velocities were determined from measurement at the intake or predicted based on the design. The early velocity information does meet the guideline approach velocity standard, but the age of the data and source must be taken into consideration. Citations were not provided for the early documents therefore it is not possible to establish the timeframe or method of the data collection. Since the intake structures for CGS were designed and constructed in the late 1970s, it is probable that the reported intake velocities of 0.2 to 0.4 fps are also from this time period. Approximately 35 years has passed since the intake design and construction data were collected and no reference is made of more recent information. In 35 years, intake conditions may have changed resulting in a change to the approach velocity. As such WDFW recommends verification that current intake velocity still reflect a range of 0.2 to 0.4 fps.

Impingement and Entrainment Studies *(Fact Sheet page 22)*

Fish impingement surveys were conducted in the late 1970s and early 1980s, and the entrainment study was likely to have occurred during the same time frame. Even though no entrainment was observed during initial monitoring and no evidence of impingement was found during any of the surveys, the data were gathered between 25 to 40 years ago. WDFW guidelines suggest that periodic biological testing be done after the initial test period to identify any problems that develop over time (page 34). Changes to the perforated plates over time and impingement of debris would likely change the approach velocities increasing the chances of emergent fry injury or mortality from impingement and entrainment.

As noted in the fact sheet, Energy Northwest conducts periodic visual inspection of the intakes and has not found evidence of adverse impacts. Data collected during the periodic visual inspection are not noted in the fact sheet therefore condition of the perforated plate, debris accumulation, entrainment and impingement of emergent fry cannot be verified. Periodic visual inspection of the intakes without supporting documentation in the fact sheet is not sufficient for WDFW to evaluate the determination that no adverse environmental impact has been demonstrated. In addition, utilizing information from periodic visual inspections provides a snapshot in time and may not be representative of actual conditions. Best professional judgment should be based on sampling for salmonid fry in the stilling well near the end of the gravity pipes or a rigorous inspection with measured parameters rather than a visual inspection.

Economic Considerations *(Fact Sheet page 22)*

EFSEC considered the economically "practicable" cost of the technological options for cooling water intake structure improvements for making determinations of what constitutes BTA that will minimize adverse environmental impacts. BPJ determined whether or not the cost of the BTA requirements would be "wholly disproportionate to the environmental benefit to be gained." Since no evidence of impingement or entrainment of species from the intake structures at CGS was found, monetary or indirect social benefit gain from improved screening was considered to be zero. Therefore the benefits to fish resources from reducing or eliminating impingement and/or entrainment did not justify the cost of incorporating new technology into the intake system.

The lack of evidence of impingement or entrainment of species constitutes the entire basis for economic evaluation. As mentioned above, the fish entrainment study and impingement surveys were conducted in the late 1970s and early 1980s, and data are between 25 to 40 years old. Recent data consists of periodic visual inspection of the intakes but no supporting data were provided to verify the conclusion of no evidence of impingement or entrainment of species from the intake structures at CGS. WDFW believes that BPJ conclusions utilizing out of date information and visual inspections provide a low level of certainty as visual inspection is not a reliable method to assess efficacy of water intake protection devices.

Best Technology Available *(Fact Sheet page 23)*

WDFW agrees that the location, design, construction, and capacity of the cooling water intake structures at CGS were clearly chosen with the intent to provide the best technology available *at the time of their construction* to minimize adverse environmental impacts. Even though the location, design, construction, and capacity of the cooling water intake structures were re-evaluated for this NPDES permit, the vast majority of the evaluation used the same data that

were available in the late 1970s when the intake was constructed. Evaluation of impacts with current data and appropriate detection methods would provide more certainty that the water intake structures at CGS meet criteria to minimize adverse environmental impacts.

NMFS Juvenile Fish Screen Criteria

Information provided by NMFS for the presence of federally protected species of steelhead and salmon in the vicinity of the intake structures and NMFS Juvenile Fish Screen Criteria were also considered during the evaluation of Best Technology Available. WDFW *Fish Protection Screen Guidelines for Washington State* and NMFS Juvenile Fish Screen Criteria have the same criteria for screening; therefore the same criteria are relevant to WDFW's evaluation. CGS intake structure inlets are perforated with 3/8 inch diameter holes, which is 4 times wider than the 3/32 inch maximum diameter listed in NMFS Juvenile Fish Screen Criteria and WDFW fry screening criteria guidelines. The 3/8 inch diameter screen perforations do not provide for the protection of fish life found in the Hanford Reach. Salmonid fry are susceptible to injury or mortality through the following mechanisms: 1) entrainment into the cooling water intake structure due to relatively large (3/8") perforations in the cooling intake structure screening material, and 2) impingement onto the screen surface, even briefly. WDFW guideline screen criteria were established to prevent salmonid fry injury and mortality under variable environmental conditions.

The purpose of screening water diversions is to protect and preserve fish life by minimizing entrainment and impingement at intake structures. Fish screening, as with any long-term activity, is an exercise in adaptive management. It is clear that Energy Northwest took fish screening into consideration when the cooling intake structures were designed in the 1970's. However, the current 3/8 inch screening material is much larger than has ever been endorsed by WDFW to protect fish life. As early as 1905, regulations specified screen size at 1/4 inch mesh opening (Easterbrooks personal communication). In addition, WDFW requires active cleaning for diversions over 3 cfs. Air burst systems have proven effective in areas with flow conditions similar to CGS and would be recommended in this case. Screening requirements, technology, and more importantly the status and condition of anadromous salmon stocks have changed since the design and construction of the intake structures.

WDFW recognizes that modification of a nuclear facility intake structure screens to 3/32 inch openings would require a review of NRC safety requirements for potential conflicts. It is our understanding that NRC did not evaluate the safety risks of the smaller diameter openings as NRC staff concluded in a biological assessment that the cooling system "may affect, but is not likely to adversely affect" both Upper Columbia River spring Chinook salmon and Upper Columbia River steelhead. Therefore a screen modification and associated safety review was not needed. NRC based their determination on the premise that "juvenile Upper Columbia River spring Chinook are too large to be entrained into the cooling system at the time they migrate through the Hanford Reach; no recent evidence of Upper Columbia River steelhead spawning has been observed in the Hanford Reach, and historically, steelhead fry in the Hanford Reach do not emerge until they are about 1 inch long and tend to seek cover after emergence; and CGS entrainment studies in 1979-1980 and 1985 collected no life stage of Upper Columbia River steelhead." The biological assessment addressed federally protected species, and NMFS provided expert opinion refuting NRC basis of determination for risk of impingement and entrainment to endangered species.

WDFW has an obligation to preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities for the citizens of Washington. All fish, including federally protected species, in the Columbia River are the property of the state. Non-protected species have commercial and recreational harvest value for the citizens of Washington whereas all fish provide social benefit. With that in mind, impacts from the CGS intake system should be considered for all fish such as the Up-River Bright fall Chinook salmon within the Hanford reach, not just federally protected fish.

Up-River Bright Fall Chinook Salmon

Up-River Bright fall Chinook salmon in the Hanford Reach, though not federally protected, is an important fishery for Washington State and should be considered when evaluating the intake impingement and entrainment impacts to fish. WDFW conducts stream surveys to determine age, gender, origin, and spawning success of this population. Over the most recent fifteen years, an average of 67,803 Up-River Bright fall Chinook salmon have spawned in the Hanford Reach with an average of 96.2 million fry emerging from the gravel each spring (Hoffarth, personal communication).

Fall Chinook adults typically spawn between mid to late October and mid to late November. Embryonic development and growth of fall Chinook salmon is highly dependent on water temperature but emergence usually ranges from mid to late February through mid to late May. Fall chinook rear for about 2 to 3 months before migrating as subyearlings. Fall Chinook have limited swimming ability as they emerge from the gravel (38 – 40 mm total length) and during the early rearing period. Even though the preferred habitat for fall Chinook salmon during early rearing is lower velocity off channel locations, fry are likely to be routinely displaced downstream as a result of flow fluctuations in the Hanford Reach. Since the intake structure for the CGS is located downstream of the primary spawning areas of the Hanford Reach, displaced fry will be very susceptible to entrainment through screens with 3/8 inch perforated openings. In addition, mid-Columbia River reservoir levels upstream of Hanford Reach in low water years fluctuate dramatically (approximately 1-12 feet vertically in a 24 hour period) and the downstream reaches though not fluctuating as dramatically are shallower and the depth to the CGS intake is less. It is likely encounters of fall Chinook at early life stages will increase in these years. In addition to displaced fry, the majority of all Hanford Reach fall Chinook fry, pre-smolts, and smolts will migrate through the area of the intake structure and be subject to the CGS intake system. Even some smolts, especially fall Chinook, are small enough to still be entrained through 3/8 inch perforations.

Fall Chinook begin out-migration soon after emergence but will be in the Hanford Reach in some numbers until August. The average size at migration is 70 mm. Fall chinook will be susceptible to entrainment and impingement for 6 months or until they reach 75 mm in size (estimated size that will not be entrained through a 3/8 inch opening). This is a significant amount of time that on average 96.2 million fry are susceptible to entrainment and/or impingement on the CGS screen with 3/8 inch openings. In order to adequately protect the Up-River Bright fall Chinook the CGS screens should be updated utilizing screening materials and best available technology that meet current WDFW and NMFS standards. From a fish screening perspective, a screen should protect and prevent the loss of nearly 100% of emergent fry.

The CGS screens are located in an area where the largest fall Chinook population in the Pacific Northwest is located. Those fish are extremely important from biological, cultural, economic,

and many other perspectives. Therefore, screening to meet current criteria with best available technology is necessary.

Conclusion

In summary, WDFW recognizes EFSEC considered expert opinions in the context of its authorities under the CWA and federal rule for "minimizing adverse environmental impact" and found that no adverse environmental impact has been demonstrated. In addition EFSEC considered the potential risks in the context of the BPJ analysis and its authorities under the CWA. Although WDFW recognizes our limited regulatory ability to influence screening improvements within the NPDES process, WDFW would prefer our fish guard WAC, RCW, and the draft *Fish Protection Screen Guidelines for Washington State* be considered in evaluation of the intake system.

WDFW believes EFSEC based their best professional judgment determination - that the existing cooling water system intake location, design, construction, and capacity represent the best technology available for minimizing adverse environmental impact - on the available data. Unfortunately, that data appears to be outdated and unverified. While we recognize the necessity to move forward with permit issuance, WDFW suggests a collective effort from Energy Northwest and the relevant federal, state, and tribal agencies to collect and verify new data associated with the intake screen. We respectfully suggest that EFSEC and Ecology consider clearly acknowledging in the NPDES permit the need to update intake data at the site.

Thank you for the opportunity to provide comments on the Fact Sheet for NPDES Permit WA002515-1 Columbia Generating Station and the determination that no adverse environmental impact from the CGS cooling water intake structures has been demonstrated. WDFW will be available to assist Energy Northwest with technical assistance to accomplishment cost effective and compliant fish screening. If you have any questions or comments, please feel free to contact me at 360-902-2593 or peggy.miller@dfw.wa.gov.

Sincerely,

Peggy Miller

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